

## What is Powder Coating:

Powder coating is a dry finishing process that has become extremely popular since its introduction over 40 years ago. More and more companies specify powder coatings for a high-quality, durable finish, allowing for maximized production, improved efficiencies, and simplified environmental compliance. Used as functional (protective) and decorative finishes, powder coatings are available in an almost limitless range of colors and textures, and technological advancements have resulted in excellent performance properties.

## Powder Coating Process

The powder coating process involves three basic steps:

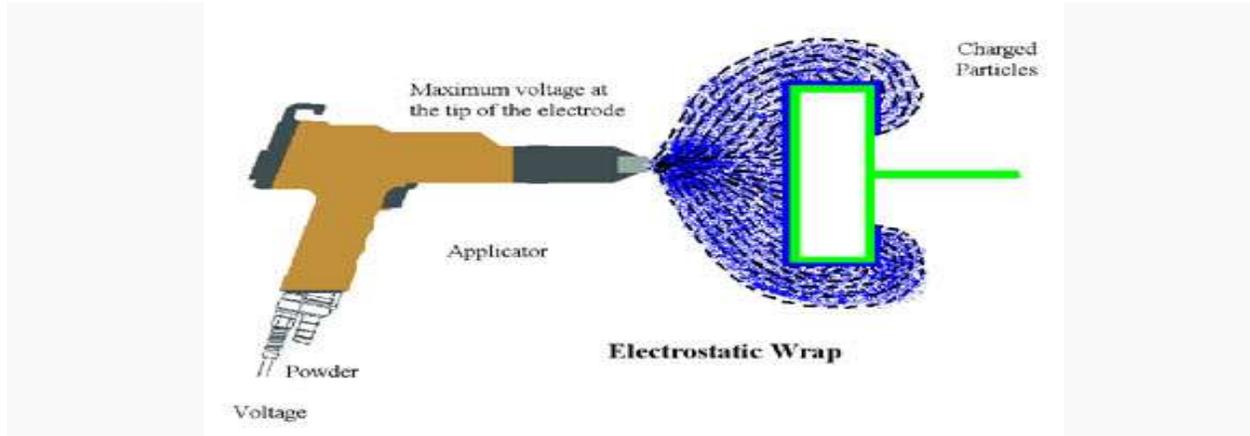
1. Part preparation or the pre-treatment
2. The powder application
3. Curing or Baking

### **Part preparation processes or the pretreatment**

Removal of oil, dirt, lubrication greases, metal oxides, welding scale etc. is essential prior to the powder coating process. It can be done by a variety of chemical and mechanical methods. The selection of the method depends on the size and the material of the part to be powder coated, the type of impurities to be removed and the performance requirement of the finished product.

Chemical pre-treatments involve the use of phosphates or chromates in submersion or spray application. These often occur in multiple stages and consist of degreasing, etching, de-smutting, various rinses and the final phosphating or chromating of the substrate. The pre-treatment process both cleans and improves bonding of the powder to the metal. Recent additional processes have been developed that avoid the use of chromates, as these can be toxic to the environment. Titanium zirconium and silanes offer similar performance against corrosion and adhesion of the powder.

## Powder application process



The most common way of applying the powder coating to metal objects is to spray the powder using an electrostatic gun, or *corona* gun. The gun imparts a positive electric charge to the powder, which is then sprayed towards the grounded object by mechanical or compressed air spraying and then accelerated toward the work piece by the powerful electrostatic charge. There are a wide variety of spray nozzles available for use in electrostatic coating. The type of nozzle used will depend on the shape of the work piece to be painted and the consistency of the paint. The object is then heated, and the powder melts into a uniform film, and is then cooled to form a hard coating.

### Curing or Baking

When a thermoset powder is exposed to elevated temperature, it begins to melt, flows out, and then chemically reacts to form a higher molecular weight polymer in a network-like structure. This cure process, called crosslinking, requires a certain temperature for a certain length of time in order to reach full cure and establish the full film properties for which the material was designed. Normally the powders cure at 200 °C (390 °F) for 10 minutes. The curing schedule could vary according to the manufacturer's specifications. The application of energy to the product to be cured can be accomplished by convection cure ovens, infrared cure ovens, or by laser curing process. The latter demonstrates significant reduction of curing time.

## **What are the advantages of using Powder Coating instead of other coating treatments?**

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1. Powder coatings emit near zero volatile organic compounds (VOC).
2. Powder coatings can produce much thicker coatings than conventional liquid coatings without running or sagging.
3. Powder coated items generally have fewer appearance differences between horizontally coated surfaces and vertically coated surfaces than liquid coated items.
4. The wide range of specialty effects are easily accomplished using powder coatings that would be impossible to achieve with other coating processes.<sup>[2]</sup>
5. Most importantly it offers long durability and corrosion resistance.

### **Applications**

Powder Coating finds large use in automotive , electronic, furniture and infrastructure industry.

Powder coating Facilities